

REMARKS

Claims 1-12 and 15-26 are pending in the application.

Claims 13 and 14 have been canceled without prejudice. The Applicants expressly reserve the right to prosecute the canceled claims in one or more continuing applications claiming the benefit of priority to the instant application and its predecessor(s). 35 USC § 120.

Claims 1, 6, 11, 15, 16, and 17 have been amended. Support for the claim amendments can be found throughout the application. Therefore, no new matter has been added. Importantly, the claim amendments should not be construed to be an acquiescence to any of the claim rejections. Rather, the amendments to the claims are being made solely to expedite the prosecution of the above-identified application. The Applicants expressly reserve the right to further prosecute the same or similar claims in subsequent patent applications claiming the benefit of priority to the instant application. 35 USC § 120.

New claims 23-26 have been added. However, because the new claims encompass only subject matter described and enabled in the instant application and encompassed by original claims 6-9, no new matter has been added.

Response to Rejections Based on 35 USC § 112¶2

Claim 1 stands rejected under 35 U.S.C. § 112¶2 based on the Examiner's contention that it is indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Specifically, the Examiner rejected the claim based on the fact that the Markush group of structures contained duplicate structures.

The Applicants concede that due to a typographical error the Markush group in claim 1 as filed contained duplicative structures. Accordingly, the Applicants have amended claim 1 to remove the duplicate structures. Obviously, the amendment to claim 1 does not reflect a change in the scope of the invention for which protection is sought because it merely corrects a typographical error.

Accordingly, withdrawal of the rejections under 35 U.S.C. § 112¶2 is respectfully requested.

Response to Rejections Based on 35 USC § 102(b)

Initially, the Applicants respectfully remind the Examiner that in order to anticipate a claim, a single source must contain all of the elements of the claim. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986); *Atlas Powder Co. v. E.I. duPont De Nemours & Co.*, 750 F.2d 1569, 1574, 224 U.S.P.Q. 409, 411 (Fed. Cir. 1984); *In re Marshall*, 578 F.2d 301, 304, 198 U.S.P.Q. 344, 346 (C.C.P.A. 1978). Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference. *See Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1271 (Fed. Cir. 1984).

Tamura

Claims 1-4 stand rejected under 35 USC 102(b), based on the Examiner's contention that they are anticipated by Tamura, J. *Trends in Glycoscience and Glycotechnology* 13 (69), **January 2001**, 65-88 ("Tamura"). Specifically, the Examiner contends that certain disaccharides disclosed in Tamura anticipate the rejected claims. The Applicants respectfully disagree.

The Applicants respectfully remind the Examiner that the instant application validly claims and is entitled to the benefit of priority to United States Provisional Patent Application serial number 60/263,621, filed January 23, 2001. *See* the instant application, page 1. Accordingly, the effective filing date of the instant application is January 23, 2001. *See* MPEP § 706.02.

The Applicants respectfully point out that the publication date of Tamura under 35 USC § 102 cannot be earlier than January 28, 2001, the date on which the article was accepted for publication. *See* Tamura, page 88 ("Received on January 18, 2001, accepted on January 28, 2001."). In fact, the publication date of Tamura is almost certainly subsequent to January 28, 2001 because articles accepted for publication in print journals are not published instantaneously. The Applicants respectfully state on the record that the

acceptance date of Tamura is subsequent to the effective filing date of the instant application, January 23, 2001.

Therefore, because the provisional application for patent filed January 23, 2001 satisfied the requirements of 35 USC 112¶1 with respect to the teachings of Tamura, the publication does not constitute prior art against the instant application under 35 USC § 102. Accordingly, the Applicants respectfully contend that no portion of the teachings of Tamura may be applied as prior art against the instant application.

Westman

Claims 1-4 stand rejected under 35 USC § 102(b), based on the Examiner's contention that they are anticipated by Westman, J. et al. *J. Carbohydr. Chem.* 14(1), 95-113 (1995) ("Westman"). Specifically, the Examiner contends that a disaccharide disclosed in Westman anticipates the rejected claims.

Accordingly, the Applicants have amended the definition of X in claim 1, removing "alkoxy". The Applicants respectfully contend that amended claim 1 does not read on compound 13 of Westman because it is a methyl disaccharide, i.e., it comprises a methoxy group at what would otherwise be its reducing terminus. As noted in the introduction to this section, in order to anticipate a claim, a single source must contain all of the elements of the claim (citations omitted). In other words, Westman does not anticipate amended claim 1 because compound 13 of Westman does not contain the element X of that claim.

Additionally, the Applicants have amended the definition of X in claim 1, adding "4-alkenyloxy". The term "4-alkenyloxy" finds general support in the application as filed. See, e.g., Figure 11, structures 61-66, explicitly depicting compounds, wherein X is 4-pentenyl, a species of 4-alkenyloxy. Consequently, the Applicants respectfully assert that no new matter has been added by this amendment.

Nilsson

Claims 6-9 stand rejected under 35 USC § 102(b), based on the Examiner's contention that they are anticipated by Nilsson, M. et al. *Carbohydr. Res.* 246, 161-172

(1993) (“Nilsson”). Specifically, the Examiner contends that a trisaccharide disclosed in Nilsson anticipates the rejected claims.

Accordingly, the Applicants have amended claim 6. First, the Applicants have amended the definition of X in claim 6, removing “alkoxy”. The Applicants respectfully contend that amended claim 6 does not read on compound 9 of Nilsson because it is a methyl trisaccharide, i.e., it comprises a methoxy group at what would otherwise be its reducing terminus. Additionally, the second of the two structures depicted in claim 6 has been removed. The deletion of the second structure is not relevant to Nilsson because the trisaccharide taught by Nilsson is not of the general structural type represented by the deleted structure. As noted in the introduction to this section, in order to anticipate a claim, a single source must contain all of the elements of the claim (citations omitted). In other words, Nilsson does not anticipate amended claim 6 because compound 13 of Nilsson does not contain the element X of that claim.

Further, the Applicants have amended the definition of X in claim 6, adding “4-alkenyloxy”. The term “4-alkenyloxy” finds general support in the application as filed. *See, e.g.*, Figure 13, structures 74-75, explicitly depicting compounds, wherein X is 4-pentenyl, a species of 4-alkenyloxy. Consequently, the Applicants respectfully assert that no new matter has been added by this amendment.

Jaurand

Claims 6-9 stand rejected under 35 USC § 102(b), based on the Examiner’s contention that they are anticipated by Jaurand, G. et al. *Bioorg. Med. Chem. Lett.* 2(9), 897-900 (1992) (“Jaurand”). Specifically, the Examiner contends that a trisaccharide disclosed in Jaurand anticipates the rejected claims.

Accordingly, the Applicants have amended claim 6. Specifically, the second of the two structures depicted in claim 6 has been removed. The Applicants respectfully contend that amended claim 6 does not read on compound 15 of Jaurand because the trisaccharide taught by Jaurand is not of the general structural type represented by the remaining structure; in other words, compound 15 of Jaurand is not within the scope of amended claim 6 because the trisaccharide taught by Jaurand is of the general structural type represented by the *deleted* structure. As noted in the introduction to this section, in

order to anticipate a claim, a single source must contain all of the elements of the claim (citations omitted). Therefore, Jaurand does not anticipate amended claim 6 because compound **15** of Jaurand does not contain a structural limitation corresponding to the trisaccharide class of which the compound is a member.

The Applicants have added new claims 23-26 to recapture the bulk of the scope of claims 6-9 removed by the aforementioned amendments. In brief, new independent claim 23 includes the structure deleted from claim 6. However, the definition of the substituent at *O*-2 of the middle pyranosyl moiety, i.e., the β -glucopyranosyl moiety, of the trisaccharide does not encompass arylalkyl. Therefore, the Applicants respectfully contend that none of new claims 23-26 reads on compound **15** disclosed in Jaurand.

Ichikawa

Claims 6-9 stand rejected under 35 USC § 102(b), based on the Examiner's contention that they are anticipated by Ichikawa, Y. et al. *Carbohydr. Res.* **141**, 273-282 (1985) ("Ichikawa"). Specifically, the Examiner contends that a trisaccharide disclosed in Ichikawa anticipates the rejected claims.

Accordingly, the Applicants have amended claim 6. Specifically, the second of the two structures depicted in claim 6 has been removed. The Applicants respectfully contend that amended claim 6 does not read on compound **15** of Ichikawa because the trisaccharide taught by Ichikawa is not of the general structural type represented by the remaining structure; in other words, compound **15** of Ichikawa is not within the scope of amended claim 6 because the trisaccharide taught by Ichikawa is of the general structural type represented by the *deleted* structure. As noted in the introduction to this section, in order to anticipate a claim, a single source must contain all of the elements of the claim (citations omitted). Therefore, Ichikawa does not anticipate amended claim 6 because compound **15** of Ichikawa does not contain a structural limitation corresponding to the trisaccharide class of which the compound is a member.

Finally, the Applicants have added new claims 23-26 to recapture the bulk of the scope of claims 6-9 removed by the aforementioned amendments. In brief, new independent claim 23 includes the structure deleted from claim 6. However, the definition of X in new claim 23 does not encompass acyloxy. Therefore, the Applicants

respectfully contend that none of new claims 23-26 reads on compound **15** disclosed in Ichikawa.

Kovensky

Claims 11, 12, 16 and 17 stand rejected under 35 USC § 102(b), based on the Examiner's contention that they are anticipated by Kovensky, J. et al. *Bioorg. Med. Chem.* 7, 1567-1580 (1999) ("Kovensky"). Specifically, the Examiner contends that a method disclosed in Kovensky anticipates the rejected claims.

To expedite prosecution to allowance, and in light of specific business considerations with respect to the claimed subject matter, the Applicants elect at this time to amend independent claim 11 to include the limitation of dependent claim 14, i.e., wherein the first mono-, di- or tri-saccharide or the second mono-, di- or tri-saccharide is covalently linked to a solid support. Nevertheless, the Applicants expressly reserve the right to pursue claims covering the solution-phase embodiments of their invention in a continuing application. *See* 35 USC § 120. Because Kovensky teaches only solution-phase oligosaccharide synthesis, the Applicants respectfully assert that amended claim 11 is not anticipated by Kovensky.

Consistent with this business-based prosecution decision, claims 13 and 14 have been canceled; notably, claim 14 was rendered redundant by the amendment to claim 11. Further, claims 16 and 17 have been amended to depend upon claims 11 and 12 in the alternative. Finally, for clarification purposes, each instance in this group of claims of the term "oligosaccharide" has been amended to include "linked to a solid support".

Lei

Claims 11, 12, 16 and 17 stand rejected under 35 USC § 102(b), based on the Examiner's contention that they are anticipated by Lei, P.-S. et al. *Bioorg. Med. Chem.* 6, 1337-1346 (1998) ("Lei"). Specifically, the Examiner contends that a method disclosed in Lei anticipates the rejected claims.

As noted above, to expedite prosecution to allowance, and in light of specific business considerations with respect to the claimed subject matter, the Applicants elect at this time to amend independent claim 11 to include the limitation of dependent claim 14,

i.e., wherein the first mono-, di- or tri-saccharide or the second mono-, di- or tri-saccharide is covalently linked to a solid support. Nevertheless, the Applicants expressly reserve the right to pursue claims covering the solution-phase embodiments of their invention in a continuing application. *See* 35 USC § 120. Because Lei teaches only solution-phase oligosaccharide synthesis, the Applicants respectfully assert that amended claim 11 is not anticipated by Lei.

Consistent with this business-based prosecution decision, claims 13 and 14 have been canceled; notably, claim 14 was rendered redundant by the amendment to claim 11. Further, claims 16 and 17 have been amended to depend upon claims 11 and 12 in the alternative. Finally, for clarification purposes, each instance in this group of claims of the term “oligosaccharide” has been amended to include “linked to a solid support”.

Accordingly, withdrawal of the rejections under 35 U.S.C. § 102(b) is respectfully requested.

Claim Objections

The Examiner objected to pending claims 5, 10, 14 and 15 as being dependent upon a rejected base claim, but indicated that the claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Applicants respectfully contend that the arguments and claim amendments made herein overcome the Examiner’s rejections of the relevant base and intervening claims, thereby overcoming the Examiner’s objection to any and all pending claims. Consequently, the Applicants respectfully maintain that all pending claims are in condition for allowance.


Allowable Subject Matter

The Applicants happily acknowledge the Examiner’s indication that pending claims 18-22 appear to be free of prior art. Further, in light of the instant Response, the Applicants believe the remaining pending claims are also allowable.

Conclusion

In view of the above amendments and remarks, the Applicants believe that the pending claims are in condition for allowance. If a telephone conversation with Applicants' Attorney would expedite prosecution of the above-identified application, the Examiner is urged to contact the undersigned. A marked-up version of the amended claims appears below.

Respectfully submitted,
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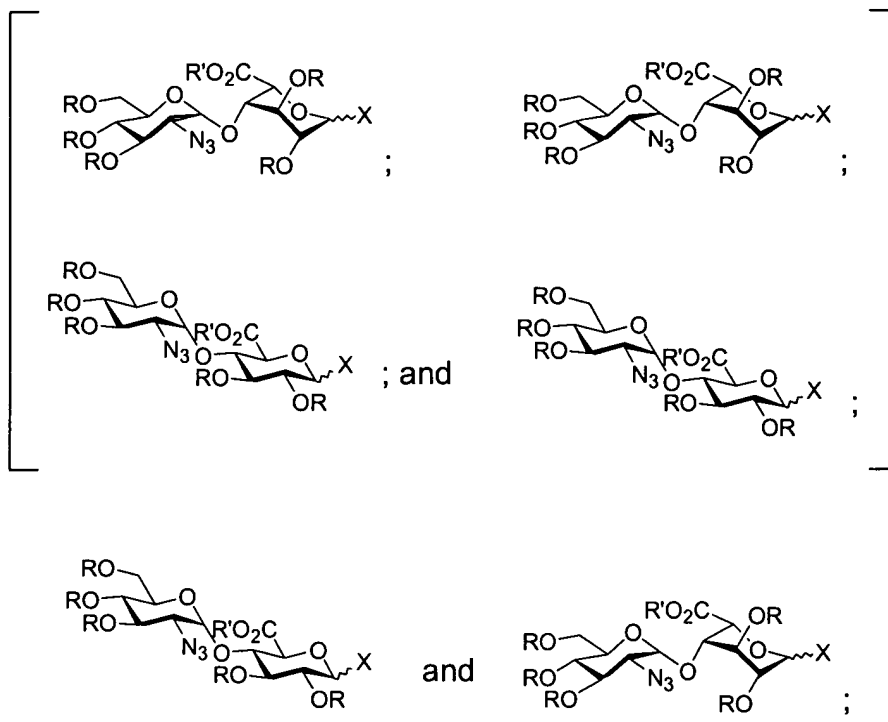
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Marked-up Version of Amended Claims Showing Changes Made

1. **(amended)** A disaccharide selected from the group consisting of:



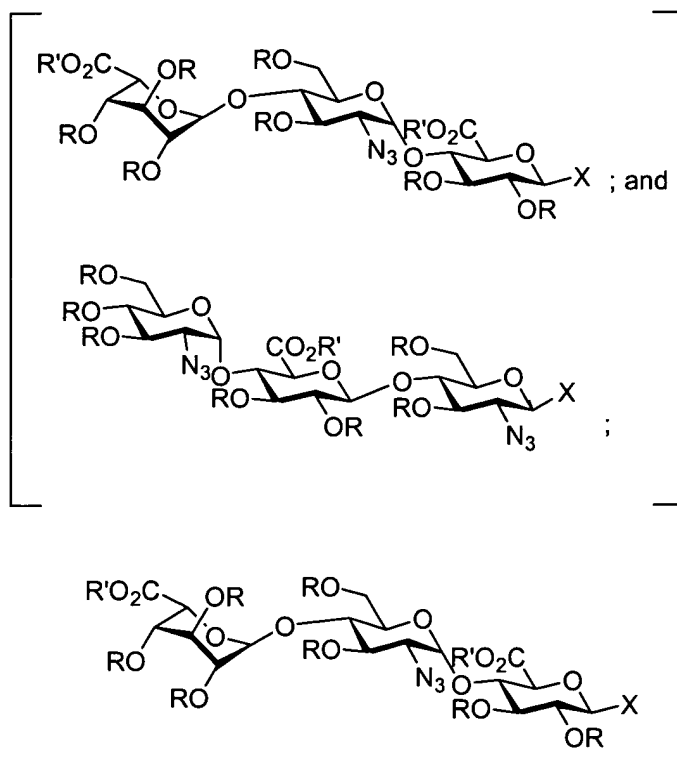
wherein

X represents independently for each occurrence hydroxyl, acyloxy, silyloxy, halide, alkylthio, arylthio, [alkoxy,] 4-alkenyloxy, aryloxy, or -OC(NH)CCl₃;

R represents independently for each occurrence H, alkyl, aryl, arylalkyl, heteroarylalkyl, silyl, acyl, alkenyloxycarbonyl, or aralkyloxycarbonyl; and

R' represents independently for each occurrence H, alkyl, aryl, arylalkyl, or heteroarylalkyl.

6. **(amended)** A trisaccharide represented by [selected from the group consisting of]:



wherein

X represents independently for each occurrence hydroxyl, acyloxy, silyloxy, halide, alkylthio, arylthio, [alkoxy,] 4-alkenyloxy, aryloxy, or -OC(NH)CCl₃;

R represents independently for each occurrence H, alkyl, aryl, arylalkyl, heteroarylalkyl, silyl, acyl, alkenyloxycarbonyl, or aralkyloxycarbonyl; and

R' represents independently for each occurrence H, alkyl, aryl, arylalkyl, or heteroarylalkyl.

11. **(amended)** A method of preparing a glycosaminoglycan, comprising the step of:

reacting a first mono-, di- or tri-saccharide, comprising an activated anomeric carbon, with a second mono-, di- or tri-saccharide, comprising a hydroxyl or amino group, to form an oligosaccharide linked to a solid support, comprising a glycosidic linkage between said anomeric carbon of said first mono-, di- or tri-saccharide and said hydroxyl or amino group of said second mono-, di- or tri-saccharide; wherein the first mono-, di- or tri-saccharide or the second mono-, di- or tri-saccharide is covalently linked to a solid support.

15. **(amended)** The method of claim 11 or 12 [14], further comprising the step of:

cleaving said covalent linkage between said oligosaccharide linked to a solid support and said solid support with an alkene metathesis catalyst and an alkene.

16. **(amended)** The method of claim 11 or 12, further comprising the step of:

sulfating a hydroxyl or amino moiety of said oligosaccharide linked to a solid support.

17. **(amended)** The method of claim 11 or 12, further comprising the step of:

removing a hydroxyl or amino protecting group from said oligosaccharide linked to a solid support by hydrogenolysis.